

22282

S/152/61/000/004/003/009  
B126/B219

15.6600

1583, 2209

AUTHORS: Vinogradov, G. V., Podol'skiy, Yu. Ya., Shepeleva, Ye. S.

TITLE: Examination of mineral oil additives as seizing protectors  
for steel

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Neft' i gaz, <sup>4</sup>no. 4,  
1961, 63-67

TEXT: In this article, a new method of determining the effect of additives on seizing and welding through friction of metals is described. This method is based on a continuous change in the sliding speed over a wide range. The tests were carried out on a four-sphere device with automatic recording of the friction coefficient. The speed variation of the upper sphere from 0 to  $19.5 \cdot 10^3$  rpm was accomplished by a specially constructed appliance. The spheres had 12.7 mm in diameter and were made of WX6 (ShKh6) steel hardened to 62 R<sub>c</sub>; all the experiments were carried out at 20°C. The naphthenic paraffin fraction of the oil MC-14 (MS-14) was used as a base oil, with the following additives: 1) 0.15 mole/l dibenzyl disulfide, 2) 0.05 mole/l 1-trichloro-5-methylpentane, 3) 0.05 mole/l

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Examination of mineral...

dibutylester of methylphosphinic acid, 4) 0.05 mole/l tri-(trichloro-ethyl) phosphite. With naphthenic paraffin in oil, seizing occurred at a considerably higher speed and at low load; an increase of the load at relatively low speeds initiated seizing. When dibenzyl disulfide was added, seizing occurred at sliding speeds that are between those at which seizing is initiated and those at which repeated and very intense seizing occurs with naphthenic paraffin oil. A trichloromethyl additive had a slight effect at low load and became more efficient on increase of the latter; the friction coefficient remained low up to the limiting speed; a further increase in load reduced the effect of the additive. The ester of methylphosphinic acid affects the seizing loads very much. Organic phosphorus compounds are very efficient and have the ability of modifying the friction surfaces; the addition of chlorine derivatives considerably increases the already high critical values of these additives. These results show that the new method facilitates the examination of the efficiency of additives. There are 4 figures.

ASSOCIATION: Akademiya bronetankovykh voysk im. I. V. Stalina (Academy of Armored Troops imeni I. V. Stalin)

SUBMITTED: October 1, 1960

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89126

S/065/61/000/003/001/004  
E194/E284

1.9600 (1153)  
AUTHORS: Vinogradov, G. V., Arkharova, V. V. and Petrov, A.A.  
TITLE: The Anti-Wear and Anti-Frictional Properties of Hydrocarbons  
PERIODICAL: Khimiya i tekhnologiya topliv i masel, 1961, No. 3, pp. 48-54  
TEXT: Four-ball machine friction and wear tests were made on the following hydrocarbons and mixtures of them: Tetracosane; 7-hexyloctadecane; 1.5-dicyclohexyl-3-heptylpentane; 1.5-diphenyl-3-heptylpentane; 1.1-diphenyldodecene-1; 1.1-diphenyldodecane; cyclohexyltetralin and dicyclohexyldecalin. The balls were 0.5" diameter of ball-bearing chrome-steel hardened to 62 Rc. Atmospheres of argon, air and oxygen were used in the tests. All the tests were carried out for one minute at a sliding speed of 23 cm/sec, in the tests with argon and oxygen the gas was blown through at a rate of 12 litres per hour at a temperature of  $100 \pm 1^\circ\text{C}$ . After each test the load was increased and the balls were rotated to present a fresh wear-surface but the lubricant was not changed. Tests were made below, at and well-above the

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The Anti-Wear and Anti-Frictional Properties of Hydrocarbons seizure load. The results are presented in the form of log/log graphs of wear against load, wear being assessed by diameter of wear-scar. The tests in argon atmosphere display considerable variation in seizure load and shape of wear curve. In general, however, in argon the seizure loads are low and the wear is small at loads below the seizure loads. The seizure is easily broken down. The test results of hydrocarbons in argon are similar to those observed for low-sulphur lubricating oils. The behaviour observed is attributed to the presence of traces of oxygen or oxygen compounds in the hydrocarbon that are capable of replacing the oxide films on freshly worn metal surfaces provided that these are not produced too rapidly. When argon is replaced by air the seizure load rises because both metal and hydrocarbons are more easily oxidized. In an oxygen atmosphere the seizure loads are still higher and the wear curves rise smoothly. These smoothly rising wear curves are most typical of the easily oxidized and relatively low viscous hydrocarbons such as cyclohexyltetralin. The more viscous and less readily oxidized hydrocarbons often have

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The Anti-Wear and Anti-Frictional Properties of Hydrocarbons  
a step in the wear curve, presumably because as the viscosity increases access of oxygen is hindered. However, in an oxygen atmosphere the graphs of wear-scar diameter against load lie within a very narrow band for a wide range of hydrocarbons including not only those tested but many others besides. At loads below the seizure load the wear is often heavier in oxygen than in air or in argon and this is attributed to oxidation of the steel during friction. Combined oxidation of steel and hydrocarbon under heavy friction conditions occurs during the exposure of fresh metal surfaces in the presence of frictional heat. The conditions are quite different from those in normal oxidation tests. The results show that molecular oxygen and organic sulphur compounds which react with steel act as anti-seizure additives and as substances which increase the chemical wear of the steel, thus behaving like extreme pressure additives. The separate and combined influences of dibenzylidisedisulphide and oxygen as extreme pressure additives are described. The main conclusions of the article are that the anti-friction and anti-wear properties of a

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The Anti-Wear and Anti-Frictional Properties of Hydrocarbons  
large number of hydrocarbons are very similar in an oxygen atmosphere. Friction and wear tests with steel balls and hydrocarbon lubricants take place in the presence of oxidizing substances which can have an important anti-seizure effect comparable with that of sulphur-containing extreme-pressure additives. It is claimed that individual high molecular weight hydrocarbons can be used as model substances for the study of anti-wear and anti-friction properties of low sulphur lubricating oils. There are 7 figures, 1 table and 6 Soviet references.

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28937

S/063/61/006/004/004/010  
A057/A129

AUTHORS: Vinogradov, G. V., Doctor of Chemical Sciences, Belkin, I. M.,  
Konyukh, I. V.

TITLE: Method for studying rheological (viscous) properties of polymer  
solutions and melts

PERIODICAL: Zhurnal vsesoyuznogo khimicheskogo obshchestva imeni D. I. Mendele-  
yeva, v. 6, no. 4, 1961, 417-421

TEXT: A short review of methods for studying rheological properties of  
polymers by investigating viscosity characteristics of solutions or melts is  
given in the present paper. After discussing principal aspects for these  
methods, capillary and rotational viscosimetry is described. Some new testing  
methods and devices developed in the Institut neftekhimicheskogo sinteza AN SSSR  
(Institute of Petrochemical Synthesis of the Academy of Sciences USSR) are also  
presented. Viscosity  $\eta$  is expressed by Newton's equation as  $\tau = \eta D$  (1)  
( $\tau$  = shear stress,  $D$  = rate gradient). Rheological characteristics of fluid  
systems were determined by the form of the fluidity curve  $\tau = f(D)$  and the  
values of the parameters. In non-Newtonian liquids  $\eta$  depends on  $D$  and  $\tau$ , thus

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Method for studying rheological ...

by determining the latter the viscosity can be estimated by means of absolute viscosimeters. Two types of viscosimeters were generally used, viz., capillary and rotational viscosimeters. The latter are especially convenient for great  $D$  values. Capillary viscosimeters operate in the range of  $D = 10^{-2} - 10^6$  sec, and  $\eta = 10 - 10^7$  dyne/cm<sup>2</sup>. To avoid "outlet effects", devices with two capillaries of different length but equal diameter were used. Constant pressure is secured by a weight pressing on a piston which floats on the polymer system. Compressed gas or extruders can also be used to effect the pressure. In the Institute of Petrochemical Synthesis a load-type microviscosimeter (Fig. 1) is used for polymer melts, a gas viscosimeter with constant pressure for melts and concentrated solutions of polymers, and a spring viscosimeter with variable consumption and pressure for solutions [AKB-2a (AKV-2a) type] and melts [AKB-5 (AKV-5) type]. A device identical to the viscosimeter in Fig. 1 was developed by I. A. Marakhonov in the NIIPPlastmass (Leningrad). Small amounts of the polymer can be investigated in this microviscosimeter. The gas capillary viscosimeter contains several cylindrical removable reservoirs of different volume with floating pistons. The latter are connected to the manometric panel at one end, and at the other to the pressure regulator, manostat and cylinder with inert gas at 150 atm pressure. Also a set of calibrated cylindrical

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## Method for studying rheological ...

capillaries of different length and diameter is used with the viscosimeter. All the three types of viscosimeters mentioned can be used up to 350°C. Rotational viscosimeters can be used in the determination of relaxation and elastic characteristics of polymer systems for studying the Weissenberg effect or the estimation of the transitions from elastic deformations to fluidity. On these devices the intervals of  $D = 10^{-8}$  to  $10^5$  sec and  $\eta = 10^{-4}$  to  $10^7$  dyne/cm<sup>2</sup> can be measured. Generally devices with coaxial cylinders were used. Many modern rotational viscosimeters have electronic mechanisms for registration and regulation or programmed changes of  $D$ . A viscosimeter of the cone-plane type (Fig. 2) was developed in the Institute of Petrochemical Synthesis for investigations of concentrated solutions or melts of polymers in inert gas atmosphere or high vacuum at temperatures of up to 300°C. One friction surface is the bottom of the rotating cup 4 and the other the plane of the cone 3. The rotation of the latter, effected by the polymer 5, is controlled by tensiometric or inductive gages. By means of a servo mechanism (which controls the hydraulic drive 10) changes in the rate of rotation of the cup 4 can be programmed. By a quick stop of the latter the relaxation of stresses can be determined. Some typical curves obtained with high-pressure polyethylene at 220°C are shown in Fig. 3. Curves OAB demonstrate the dependence of the shear stress on deformation (diagrams 1-4;

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deformation rates 0.75, 2.1, 2.8 and  $21 \text{ sec}^{-1}$ , respectively). Curves BC show the process of shear stress relaxation at a momentary stop of deformation in points B. On the flow curve (left upper corner in Fig. 3) the points 1-4 are shown corresponding to the stop on the "stress-deformation" curves. Investigations of concentrated polymer solutions at temperatures below  $100^{\circ} - 120^{\circ} \text{C}$  are carried out by the present authors on viscosimeters with coaxial cylinders of the type  $\Pi\text{BP-1}$  (PVR-1) described by V. P. Pavlov [Ref. 21: Trudy tret'yey Vses. konf. po kolloidnoy khimii (Transactions of the third All-Union conference on colloid chemistry), Izd. AN SSSR, M., 1956, p. 144], and Yu. F. Deynega, V. P. Pavlov and G. V. Vinogradov [Ref. 44: Zav. lab., 26, no. 3, 353 (1960)]. There are 3 figures and 45 references: 13 Soviet-bloc and 32 non-Soviet-bloc.

ASSOCIATION: [Abstracter's note: apparently the Institute of Petrochemical Synthesis is the author's institute.]

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24750

S/191/61/000/007/008/010  
B101/B215

15-8360

AUTHORS: Kut'kov, A. A., Vinogradov, G. V.  
TITLE: Lubricant layers on the surface of plastics  
PERIODICAL: Plasticheskiye massy, no. 7, 1961, 38-41

TEAT: Based on the use of polyamide resins, such as polycaprolactam (caprone), anide (nylon), polyamide 68, AK-7 (AK-7), 54. 548 and polyurethane IV-1 (PU-1) in slide bearings, the present paper deals with the following problems: 1) proof of the orientation of oil molecules of polar activity on the surface of the polymer through electron diffraction studies. 2) Examination of the causes of molecular disorientation on the surface of the polymer. 3) Determination of the carrying capacity of the lubricant layer on the polymer surface. The orientation of the lubricant layer on the surface was proved by the EM-3 (EM-3) electron microscope. Copolymer 60-40 and polycaprolactam were used for the study. Commercial oil 20 (spindle oil 3), and commercial oil 45 (machine oil C (S)) were used as lubricants. The oils contained 0.5 % of oleic acid. The electron diffraction pictures were taken at 30-40°C. Polymer films were obtained

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Lubricant layers on the surface ...

by the following method: Copolymer 6C-40 was dissolved in methanol, and a drop was put upon the surface of water. The thin film thus formed was separated from the water by a sieve and then applied to the sample according to the method described by Z. G. Pinsker (Ref. 1: Difraktsiya elektronov (Diffraction of Electrons), izd. AS SSSR, 1949). Exposure in the electron microscope at 30-40°C showed a crystalline structure without point reflexes for the polymer film without oil layer. Polymer films with oil layers showed point reflexes which proved the orientation of the molecules in the boundary layer. The interplanar spacing  $d$  for the electron diffraction patterns was calculated from the equation  $rd = L\lambda$ . It proved to be in agreement with the data of Ref. 1. A 15-day storage of the sample in a chamber free from dust showed that the point reflexes did not disappear, i.e., the lubricant was not absorbed by the resin. The point reflexes disappeared on heating and disorientation set in. At 30-40°C the electron diffraction pattern corresponded to a crystalline substance, and at 90°C it changed into that of an amorphous substance. The critical temperature at which disorientation sets in was found to correspond to the yield point of the polymer concerned. The carrying capacity was determined by A. A. Kut'kov's method (Izmeritel'naya

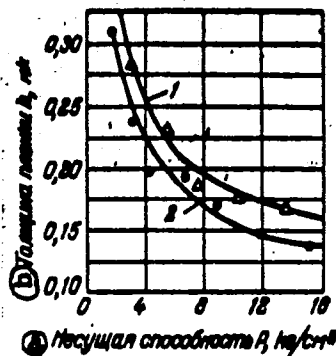
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Lubricant layers on the surface...

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tekhnika, 10, 11 (1959)). Results are shown in Fig. 4. G. I. Fuks and R. M. Matveyevskiy are mentioned. There are 4 figures and 23 references: 20 Soviet-bloc and 3 non-Soviet-bloc.

Fig. 4: Carrying capacity of lubricant layers on the surface of polycaprolactam. Legend: 1) Commercial oil 45 (machine oil S); 2) commercial oil 20 (spindle oil 3); a) carrying capacity  $P$ , kg/cm<sup>2</sup>; b) film thickness  $h$ ,  $\mu$ .



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DEYNEGA, Yu.F.; DUMANSKIY, A.V.; VINOGRADOV, G.V.

Electrization and rheological properties of nonaqueous plastic  
disperse systems. Koll. zhur. 23 no.1:25-30 Ja-F '61.

(MIRA 17:2)

1. Institut obshchey i neorganicheskoy khimii AN UkrSSR, Kiev.

1.9600

S/032/61/027/001/030/037  
B017/B054

AUTHORS: Bezborod'ko, M. D., Shabarov, L. I., Podol'skiy, Yu. Ya.,  
and Vinogradov, G. V.

TITLE: Device for Testing the Wear Resistance and Antifriction  
Properties of Plastic Materials

PERIODICAL: Zavodskaya laboratoriya, 1961, Vol. 27, No. 1, pp. 104-106

TEXT: A device was developed for testing the wear resistance and anti-friction properties of plastic materials. The plastic material is applied to one of the end surfaces of a thin-walled cylindrical tube, and its friction is determined with a metal surface. The moment of friction is determined tensometrically. The resistance of caprone and Fluoroplast-4 to wear by 40X (40Kh) steel was established by determining the friction coefficients. Results showed that the friction coefficients increased with time, then slowly dropped, and finally remained constant. This course of change can be explained by an increase in temperature of the contact surfaces. There are 3 figures and 3 Soviet references.

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VINOGRADOV, G.V.

The basic problems of theory and testing methods in the study  
of polymer rheology.

Report presented at the 13th Conference on high-molecular compounds  
Moscow, 8-11 Oct 62

37676

S/179/62/000/002/008/012  
E194/E435

15.6700

11.9700

AUTHORS: Bezborod'ko, M.D., Vinogradov, G.V. (Moscow)  
TITLE: Friction and wear of steel in the presence of metallic  
and copper sulphide powders  
PERIODICAL: Akademiya nauk SSSR. Izvestiya. Otdeleniye  
tekhnicheskikh nauk. Mekhanika i mashinostroyeniye,  
no.2, 1962, 75-83

TEXT: The results are described of 4-ball machine tests carried out with a) dry powders of copper, nickel, iron, tin (as used in cermet manufacture), aluminium and brass; b) the powders in the form of pastes or suspensions in two different mineral oils and in glycerine; c) iron powder modified on the surface by phosphiding and sulphiding. At very high contact loads powders of copper, copper sulphide and some other metals have very good anti-wear properties and greatly improve the anti-wear properties of mineral oils. The presence of a liquid lubricating medium lowers the very high friction of powders. Suspensions of phosphided and sulphided iron powder in oils behave similarly to the usual organic phosphorus and sulphur additives in lubricants.

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Friction and wear ...

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E194/E435

Lubricants which actively promote surface reactions with metal greatly reduce the friction and wear of hardened steels in the presence of metallic powders such as those of nickel and iron. An important function of the lubricant is to modify the wear products (metal particles) so that not only are friction and wear of hardened steel in their presence greatly reduced but also that the wear products themselves become able to act as anti-scuffing additives in the oils. The experimental data presented is of interest in connection with friction and wear of cermets, combinations of lubricants and certain metal powders, and the interaction between lubricant and wear products. There are 9 figures. X

SUBMITTED: March 16, 1961

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S/683/62/000/000/008/020  
E194/E155

**AUTHORS:** Bezborod'ko, M.D., Vinogradov, G.V.,  
Podol'skiy, Yu.Ya., and Shabarov, L.I.

**TITLE:** Four-ball friction machines and modifications of them  
for studying the anti-frictional properties and wear  
resistance of plastics

**SOURCE:** Metody ispytaniya na iznashivaniye; trudy soveshchaniya,  
sostoyavshegosya 7-10 dek. 1960. Ed. by  
M.M. Khrushchov. Moscow, Izd-vo AN SSSR, 1962. 81-88

**TEXT:** Plastic parts are now being extensively used under  
conditions of sliding with a wide range of loads and speeds. They  
differ from metals in that their thermal conductivity is low, in  
that they tend to be of uniform structure throughout, and in that  
lubricant additives may not act on them in the same way as they do  
on metals. The sliding properties of plastics should be studied on  
various materials and with various kinds of lubrication. Four-ball  
machines can be used, or fixtures adapted for testing two hollow  
cylindrical specimens in edge contact which can be fitted either in  
a four-ball machine or in a normal drilling machine. A detailed  
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Four-ball friction machines and ...

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description is given of the fixture for making friction tests between two hollow cylinders. The test specimen being insulated from the machine shaft and from the frame, it is possible to study electrical effects in friction, or the influence of electric current on friction between plastic and metal. The frictional torque is measured by a strain gauge arrangement. In testing, it is important to ensure that the quality of surface finish and contacting of the specimens throughout the surface is uniform. Surface finish is examined with a binocular microscope and plastic specimens may be polished by running-in against a lubricated metal specimen. With the equipment described it was possible to test thermoplastic and thermosetting materials, including reinforced plastics at specific pressures in the range 2.5 to 300 kg/cm<sup>2</sup> for flat specimens and up to 8000 kg/cm<sup>2</sup> in the case of plastic balls at sliding speeds ranging from 0.1 to 20 m/sec. The frictional systems could be operated at temperatures up to 200 °C by circulating a heat-transfer medium. Test results obtained with various combinations of plastic, metals and lubricants are described and it is shown that the anti-frictional properties and wear-resistance of plastics sliding on metals depend very greatly on the nature of the lubricant.

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There are 6 figures.

S/883/62/000/000/015/020  
E194/E155

AUTHORS: Vinogradov, G.V., Podol'skiy, Yu.Ya., and  
Bezborod'ko, M.D.

TITLE: The use of point-contact friction machines to assess  
wear of metals and the wear- and friction-reducing  
properties of lubricants

SOURCE: Metody ispytaniya na iznashivaniye; trudy soveshchaniya,  
sostoyavshegosya 7-10 dek. 1960. Ed. by .  
M.M. Khrushchov. Moscow, Izd-vo AN SSSR, 1962. 152-163

TEXT: Point-contact friction machines such as four-ball, two-  
ball and two-cylinder types are useful for fundamental work on  
friction and wear, besides their more usual practical applications.  
Accordingly, the Institut neftekhimicheskogo sinteza (Institute of  
Petrochemical Synthesis) has developed an integrated series of  
such machines and this article reviews their published descrip-  
tions and the principal results which have been obtained with them.  
Machine MT-5 (MT-5) is a two-ball machine; the rest can use  
either four balls or two cylinders. Machine MT-2 is used at medium  
speeds and moderately high temperatures. The upper frictional  
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The use of point-contact friction ... S/883/62/000/000/015/020  
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element is driven at speeds in the range 50 - 1200 r.p.m. by a hydraulic motor, and loads up to 500 kg are applied hydraulically to the lower elements. The frictional elements can be thermostatted or operated in a controlled atmosphere. Machine MT-3 is used for high speeds (up to 20 000 r.p.m.). A lever loading device is used at low speeds because of its sensitivity, and hydraulic loading at higher speeds to overcome vibration difficulties in the lever system. Lubricant can be circulated during test. Machine MT-4 is used for tests in vacuo or in atmospheres of special gases in the speed range up to 3000 r.p.m. with temperatures up to 500 °C. The brake is in the vacuum chamber and torque is measured by strain gauges. Two-ball machine MT-5 in which both balls can be driven, the lower one at a low speed, is used when it is required to produce sufficient wear material for analysis. It offers a wide range of sliding speeds which is useful in studies of cold welding and other methods of working materials under pressure. Vacuum and special gas atmospheres are also possible with machine MT-6, which differs from MT-4 in that very low sliding speeds and higher temperatures can be used. The test temperature can be varied during the test

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The use of point-contact friction... S/883/62/000/000/015/020  
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according to a pre-set programme. The following conclusions have been drawn from published work carried out in this series of machines. Under severe conditions the lubricating properties of refined naphthenic oils depend mainly on viscosity. The presence of oxygen or oxidation products greatly improves performance under boundary lubrication conditions and can help to prevent seizure. An important function of lubricants is to deliver oxidants to the friction zone, and this is why seizure may be more catastrophic in oil baths than with thin film lubrication. Studies have been made of the modes of action and limitations of sulphur-, chlorine- and phosphorus-containing additives, of changes in the metal surfaces, of the effect of additives in modifying wear debris, and of the effect of soft and hard particles suspended in the oil. Studies have been made of various salts as lubricants. The mechanism of abrasive wear has been studied. There are 5 figures and 1 table.

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<sup>1697</sup>  
S/191/62/000/005/010/012  
B110/B101

15. P200

AUTHORS: Bezborod'ko, M. D., Vinogradov, G. V., Shabarov, L. I.

TITLE: Friction and wear of plastics at high contact pressures

PERIODICAL: Plasticheskiye massy, no. 5, 1962, 53-57

TEXT: Friction was studied at point contact of 19.05 mm diameter balls made from: (1) phenol-formaldehyde resin, (2) glass plastic АГ-4 (AG-4) on the basis of phenol-formaldehyde resins (~ 60% glass fiber of 5-7  $\mu$  diameter), (3) phenol-formaldehyde resin with ~ 60% sulfite cellulose, (4) metal balls from ШХ-6 (ShKh-6) steel with 62 R<sub>c</sub> hardness. Under 5-100 kg loads the following lubricants were used: (1) the nonpolar naphthene paraffin fraction of НТЭ-МС-20 (NPF-MS-20) oil, both pure and with 2% by weight admixtures of tributyl phosphite and "khloref 40"; (2) castor oil and molten stearic acid; (3) cumene; (4) water and aqueous solutions of high heat capacity and thermal conductivity, (5) glycols and multivalent alcohols. The minimum load giving rise to irreversible deformations, served as a criterion for lubricant efficiency. Only a slight effect of the lubricants was found for the pair plastic-plastic.

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Friction and wear of plastics at ...

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For the pair steel-plastic, intensive wear and surface destruction were observed when using the following lubricants: water; aqueous 5% solution of tartaric acid, citric acid, pentaerithrite, trimethylol ethane; phenol melt and alcoholic solution of formaldehyde resin. Corrugation of the smooth surface was found for lubricant ЦИАТИМ-201 (TsIATIM-201), Hrc MC-20 (Npf MS-20), Npf MS-20 + 2% khloref 40, Npf MS-20 + 2% tributyl phosphite, castor oil, ethylene glycol, diethylene glycol and glycerin. Here glycerin proved best, since the diameter of the depression did not increase and the surface of the plastic balls remained smooth over the total load range, even for 5-6 hr. The anti-wear and anti-friction properties of glycerin for the pair steel-plastic may be ascribed to modification of the steel surface (regeneration of the oxide layers and formation of ferrous glycerates). There are 6 figures and 1 table. ✓

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BEZBOROD'KO, M.D.; VINOGRADOV, G.Y.; KRIVOSHEIN, G.S.; LYAN GO-LIN'  
[Liang Kuo-lin]; PODOL'SKIY, Yu.Ya.

Investigating wear-preventing properties of lubricants under  
rolling-friction conditions. Tren.i izn.mash. no.15:420-431 '62.  
(Lubrication and lubricants—Testing) (MIRA 15:4)

VINOGRADOV, G.V.; LYAN GO-LIN' [Liang Kuo-~~lin~~]; PAVLOVSKAYA, N.T.

Wear preventing and antifriction properties of lubricating oils  
under heavy friction conditions. Tren.i izn.mash. no.15:432-477  
'62. (MIRA 15:4)

(Lubrication and lubricants—Testing)

1474  
S/069/62/024/006/002/009  
B101/B180

11940  
AUTHORS:

Deynega, Yu. P., Vinogradov, G. V., Lobastova, A. V.

TITLE:

Temperature and frequency dependences of the dielectric parameters of non-aqueous plastic disperse systems

PERIODICAL: Kolloidnyy zhurnal, v. 24, no. 6, 1962, 659-666

TEXT: The  $\epsilon$  and  $\tan \delta$  were measured on sodium castorate ("Konstalin"), calcium soap ("Solidol"), and lithium stearate (201 greases) at various temperatures and frequencies  $f$ . Fixed oriented structures were obtained by suddenly stopping the viscosimeter rotor. In the case of "Konstalin",  $\epsilon$  and  $\tan \delta$  were independent of  $f$  below 50 kc/sec, but  $\epsilon$  falls when  $f > 50$  kc/sec and also as the deformation rate rises.  $\tan \delta$  reaches a maximum at  $\log f \sim 6$ . The effect of  $f$  on  $\tan \delta$  diminishes and  $\epsilon$  drops, with increasing particle orientation. Rising temperature shifts  $\epsilon_{\min}$  and  $\tan \delta_{\max}$  to higher frequencies.  $\epsilon$  rises between 20 to 80°C and drops a little at 98°C. The temperature coefficient of  $\tan \delta$  is positive at low and negative at high frequencies. The frequency dependence of  $\epsilon$  is not strong for

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Temperature and frequency dependences ...

S/069/62/024/006/002/009  
B101/B180

"Solidol", and increases only by 10% when temperature is raised from 20 to 60°C. For grease 201,  $\epsilon$  was independent of frequency between 20 and 80°C. The dielectric constant of "Solidol" fell with increasing particle orientation, but there was no orientation effect with grease 201. Conclusions: The effect of orientation on the dielectric properties can be studied with solidified oriented structures of a disperse phase containing anisodiametric particles. In the case of non-aqueous systems containing a hydrophilic disperse phase,  $\epsilon$  and  $\tan \delta$  are strongly dependent on  $f$  in the radiofrequency range. This is attributed to electrical polarization due to interfacial ion transfer, i. e., along the particle surfaces of the disperse phase. The relaxation time, which was found to be of the order of  $10^{-7}$  sec, is the most important quantitative characteristic of surface polarization. Non-aqueous systems in which electrokinetic effects are produced by an interfacial double layer, display surface polarization and varying dielectric characteristics. The intensity of surface polarization and its effect on  $\epsilon$  and  $\tan \delta$  are dependent on the orientation of particles in the disperse phase. Polarization diminishes as the angle between the

Card 2/3

Temperature and frequency dependences ...

S/069/62/024/006/002/009  
B101/B180

preferred direction of the principal axes of the disperse particles and that of the electric field increases. Within the low-frequency range  $\tan \delta$  increases with rising temperature as a result of higher bulk conductivity. There are 4 figures.

ASSOCIATION: Institut obshchey i neorganicheskoy khimii AN USSR, Kiyev  
(Institute of General and Inorganic Chemistry of the  
AS UkrSSR, Kiyev)

SUBMITTED: September 28, 1962

Card 3/3

13799  
S/069/62/024/006/003/009  
B101/B180

11.9466  
AUTHORS: Deynega, Yu. F., Vinogradov, G. V.

TITLE: Effect of an electric field on the rheological properties of non-aqueous plastic disperse systems

PERIODICAL: Kolloidnyy zhurnal, v. 24, no. 6, 1962, 667-673

TEXT: Mineral oil thickened with 20.6% sodium castorate was subjected to a voltage of  $\pm 100$  v in a rotary viscosimeter in which its stationary outer cylinder and rotating inner cylinder acted as capacitor plates. Shear stress  $\tau$  was measured and plotted versus time  $t$ .  $\tau$  dropped sharply when voltage was applied, due to electrokinetic effects. Under the influence of the electric field a wall layer enriched with the dispersion medium is formed on outer cylinder. Serrated  $\tau$ -versus- $t$  curves were obtained by alternating the potential of the rotor during deformation. This was due to the passage of the dispersion medium through the lubricant, leading gradually to uniformity, when  $\tau$  approached a steady value after several cycles. Conclusions: In plastic lubricants there are double electric layers at the interface between the hydrophilic disperse phase and the

Card 1/2

Effect of an electric field on the ...

S/069/62/024/006/003/009  
B101/B180

non-polar dispersion medium. The phase transport caused by the electric field entails reversible or irreversible structural changes, depending on conditions. Phase transport in an electric field can be used to change the concentration of the disperse phase on solid surfaces and to adjust the wall slip. Simultaneous deformation and phase transport may give rise to the repeated structuralization and destructuralization of the plastic system. There are 3 figures. X

ASSOCIATION: Institut obshchey i neorganicheskoy khimii AN USSR, Kiyev  
(Institute of General and Inorganic Chemistry of the  
AS UkrSSR, Kiyev)

SUBMITTED: September 28, 1961

Card 2/2

26.2190

1861"  
S/020/62/143/004/021/027  
B101/B138

AUTHORS: Deynega, Yu. F., and Vinogradov, G. V.

TITLE: Effect of strong electric fields on the structure of non-aqueous plastic disperse systems

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 143, no. 4, 1962, 898-901

TEXT: Because electrokinetic effects have been observed with non-aqueous pseudogels of soaps, it is thought that double electric layers and diffuse layers may exist on the interfaces of such systems. This structure sensitivity to the effect of electric fields was examined by a polarization-optical method. Some "Solidol" (mineral oil thickened with calcium soap) was put between two glass plates, on the outer surfaces of which aluminum foils were attached as electrodes. The electrode spacing was 0.6 mm, and a d.c. field with a gradient of 15 kv/cm was applied. An oriented structure was created by spreading the lubricant perpendicular to the electric field. It was found that (1) the dispersion medium (mineral oil) migrates toward the cathode; (2) the dispersion medium exhibits no birefringence; (3) the structural framework is pressed against the anode causing, besides cata-

Card 1/3

S/020/62/143/004/021/027  
B101/B138

Effect of strong electric fields...

phoresis, strong interaction between the anode and negatively charged particles; (4) the opposite occurs with pole reversal, which can be repeated any number of times; (5) if the direction of the hardened structure coincides with that of the electric field, the migration effects are less intense. Konstalin (spindle oil, thickened with 20.6% sodium castorate) was used to study the successive destruction and thixotropic restoration of the structure under an electric field in the plastoviscometer, rotor and body of which were the electrodes; potential difference was 100 v, and speed was 96 rpm. When a negative potential was applied to the rotor, the readily deforming mineral oil collected around it, and the shear stress dropped to some fractions of the initial value. Here as well, the effect could be repeated by pole reversal. When the potential was switched off, shear stress returned rapidly to its initial value. Thus, by varying the resistance of a system to deformation, it is possible to increase or reduce its surface slip. There are 2 figures.

Card 2/3

Effect of strong electric fields...

S/020/62/143/004/021/027  
B101/B138

ASSOCIATION: Institut obshchey i neorganicheskoy khimii Akademii nauk USSR  
(Institute of General and Inorganic Chemistry of the Academy  
of Sciences UkrSSR)

PRESENTED: September 23, 1961, by V. A. Kargin, Academician

SUBMITTED: September 19, 1961

Card 3/3

VINOGRADOV, Georgiy Vladimirovich

"Anti-wear and anti-friction properties of mineral oils and other lubricants"  
report to be submitted for the 6th World Petroleum Congress,  
Frankfurt am Main, W. Germany, 19-26 Jun 63.

VINOGRADOV, G.V.; KONSTANTINOV, A.A.; PAKSHVER, E.A.; FROLOVA, A.P.

Study of viscose viscosity. Khim.volok. no.1:33-38 '63. (MIRA 16:2)

1. Institut neftekhimicheskogo sinteza AN SSSR (for Vinogradov, Konstantinov). 2. Vsesoyuznyy nauchno-issledovatel'skiy institut steklyanogo volokna (for Pakshver). 3. Kalininskiy kombinat iskusstvennogo volokna (for Frolova).  
(Viscose) (Viscosity)

PAKSHVER, E.A.; VINOGRADOV, G.V.; KONSTANTINOV, A.A.; FROLOVA, A.P.

Varying viscosity of viscose during the process of ripening  
prior to formation. Khim.volok. no. 1:38-41 '63.

(MIRA 16:2)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut steklyanogo  
volokna (for Pakshver). 2. Institut neftekhimicheskogo sinteza  
AN SSSR (for Vinogradov, Konstantinov). 3. Kalininskiy  
kombinat iskusstvennogo volokna (for Frolova).  
(Viscose) (Viscosumetry)

PAKSHVER, E.A.; VINOGRADOV, G.V.

Evaluating the polydispersity of viscose by its viscosity. Khim.-  
volok. no.2:25-29 '63. (MIRA 16:5)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut steklyanogo  
volokna (for Pakshver). 2. Vsesoyuznyy nauchno-issledovatel'skiy  
institut neftesinteza AN SSSR (for Vinogradov).  
(Viscose) (Viscosity)

GLUKHOV, Ye.Ye.; VINOGRADOV, G.V.; KLAZ, S.I.

Rheology of polymers. Rheological properties of polymer  
melts under high deformation rates. Vysokom. soed. 5 no.10:  
1543-1548 0 '63. (MIRA 17:1)

1. Nauchno-issledovatel'skiy institut plasticheskikh mass.

DEYNEGA, Yu.F.; VINOGRADOV, G.V.

Jump in the electrostatic potential at the moment of stoppage  
of the flow of plastic disperse systems. Koll. zhur. 25 no.3:  
379-380 My-Je '63. (MIRA 17:10)

1. Institut obshchey i neorganicheskoy khimii AN UkrSSR, Kiev.

45157

S/020/63/148/002/032/037  
B192/B101

15.8500

AUTHORS: Vinogradov, G. V., Belkin, I. M., Kargin, V. A., Academician

TITLE: High elasticity, shear strength and development of a stationary viscous flow in flowing polymers

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 148, no. 2, 1963, 369 - 372

TEXT: The transition from elastic deformation to the development of a stationary viscous flow in polymers was investigated on the substances Alkathene-2 (polyethylene) and block-polystyrene. With a rotary diffraction viscosimeter the shear stress  $\tau$  as a function of the deformation  $\dot{\gamma}$  was measured at various temperatures  $T$  for different constant deformation rates  $\dot{\gamma}$ . Calibration curves  $\tau(\dot{\gamma})$  at 114, 140 and 195°C with  $\dot{\gamma}$  values from 0.028 to 21 sec<sup>-1</sup> are given for polyethylene. For all selected temperatures the curves at low  $\dot{\gamma}$  first rose monotonically with  $\dot{\gamma}$  and then levelled to a constant value; but, for higher  $\dot{\gamma}$  values they rapidly rose to a maximum and then dropped monotonically to a constant value. For the deformation  $\dot{\gamma}_s$ , where  $\tau$  turns constant, there holds:  $\dot{\gamma}_s = A + B \log \dot{\gamma}$ ,  $B$  being about

Card 1/2

High elasticity, shear ...

S/O20/63/148/002/032/037  
B192/B101

2 for all temperatures, and  $\lambda$  decreasing with rising temperature. For monotonic curves the transition from the solid state to the development of a stationary flow occurs without a change in structure, for curves with a maximum, a change in structure takes place when passing the maximum. The good reproducibility of the calibration curve when the experiments are repeated, as well as the fact of the energy of activation being almost the same both at the limit of resistance and when the flow becomes stationary, lead to the conclusion that the change in structure is reversible and unattended by any destruction of the macromolecules. The modulus of rigidity  $G$  was ascertained from the rise of the curves  $\tau(\dot{\gamma})$  at  $\dot{\gamma} = 0$ . For small  $\dot{\gamma}$ , there resulted the functionality  $G = a + b \cdot \log \dot{\gamma}$ , where  $b = 4$  for polyethylene in the temperature range investigated,  $b = 8$  for polystyrene at  $160^\circ\text{C}$ ,  $b = 2.5$  at  $210^\circ\text{C}$ . With rising  $\dot{\gamma}$ ,  $G(\dot{\gamma})$  makes a distinct kink for the value of  $\dot{\gamma}$ , corresponding to a maximum appears in the curves  $\tau(\dot{\gamma})$ , and turns constant where the substance enters the field of high elasticity. There are 4 figures.

SUBMITTED: June 12, 1962

Card 2/2

L 10832-63

EPR/EPF(c)/EWP(j)/EWT(m)/BDS--ASD--Pr-l/Ps-l/Pc-l--RM/WW

ACCESSION NR: AP3000752

S/0020/63/150/003/0574/0577

73  
72

AUTHOR: Vinogradov, G. V.; Malkin, A. Ya.; Prozorovskaya, N. V.; Kargin, V. A.,  
Member of academy of Sciences

TITLE: Rheology of polymers. Temperature-invariant characteristic of anomalous-viscous systems

SOURCE: AN SSSR. Doklady, v. 150, no. 3, 1963. 574-577

TOPIC TAGS: rheology of polymers, temperature-invariant, viscosity, high pressure polyethylene, alkatene 2 block polystyrene, isotactic polypropylene, Newtonian viscosity, rate of deformation

ABSTRACT: The viscosity of high pressure polyethylene, alkatene 2, block polystyrene and isotactic polypropylene was determined in a wide range of temperatures. This data, i.e., Newtonian viscosity  $\eta$  and the rate of deformation  $D$  at different temperatures, was plotted using logarithmic coordinates. When the Newtonian viscosity was plotted against temperature  $T$ , an invariant curve was obtained for each polymer. This method can prove useful for determining viscosity values in a greater range of  $D$  rates than can be obtained experimentally: all that is required experimentally is data for one  $T$  curve and the  $\eta$  at 3 or 4

Card 1/2

L 10832-63

ACCESSION NR: AP3000752

temperatures so that the temperature-invariant curve can be drawn. Orig. art. has:  
4 figures and 2 equations.

ASSOCIATION: Institut neftekhimicheskogo sinteza Akademii nauk SSSR (Institute of  
Petrochemical Synthesis, Academy of Sciences SSSR)

SUBMITTED: 07Jan63

DATE ACQD: 21Jun63

ENCL: 00

SUB CODE: 00

NO REF SOV: 003

OTHER: 006

ch/100  
Card 2/2

L 17543-63

EPF(c)/ENT(m)/BDS Pr-4 RM/WW

ACCESSION NR: AP3004428

S/0020/63/151/004/0879/0882

AUTHORS: Deynaga, Yu. F.; Vinogradov, G. V.

TITLE: Behavior in an electric field and stabilities of nonaqueous plastic dispersed systems

SOURCE: AN SSSR. Doklady\*, v. 151, no. 4, 1963, 879-882.

TOPIC TAGS: surfactant, polarized light, barium dialkyldithiosulfate, DF-1, Ca-grease, Li-grease, Na-grease, phase transition, electric field, charge exchange, dispersed phase, syneresis.

ABSTRACT: Earlier investigations by the authors revealed the possibility of studying the influence of surfactants on the structure and electrical properties of plastic systems by observing the solidified orientated flow structures in polarized light. Admixtures of 50% solution of barium dialkyldithiosulfate (DF-1) in oil (5 - 15%) were mixed with hydrated Ca-grease, Li-grease and Na-grease and changes in the microstructure of the systems and phase transition in an electric field were observed by a method described in the previous papers. The results are presented in 15 color photographs. The action of an electric field can cause a reversible compression of the three-dimensional structural framework in plastic

Card 1/2

L 17543-63

ACCESSION NR: AP3004428

2  
dispersed systems. Charge exchange of the dispersed phase is observed in the presence of surfactants. Differently charged particles can exist on the boundary of the phase separation. When the greases are stored, the change of the surface of particles in the dispersed phase can have a deciding effect on syneresis. Orig. art. has: 4 figures.

ASSOCIATION: Institut obshchey i neorganicheskoy khimii Akademii nauk USSR.  
(Institute of General and Inorganic Chemistry, Academy of Sciences, USSR)

SUBMITTED: 25Dec62

DATE ACQ: 21Aug63

ENCL: 00

SUB CODE: PH, CH

NO REF SOV: 005

OTHER: 000

Card 2/2

VINOGRADOV, G. V.; NAMEIKIN, N. S.; NOSOV, M.

"Antiwear & antifric properties of polyorganosiloxanes and their mix with hydro."  
report submitted to Intl Lubrication Conf, Washington, D.C., 13-16 Oct 64.

ACCESSION NO: AP4024413

S/0204/64/004/001/0170/0175

AUTHOR: Vinogradov, G. V.; Nametkin, N. S.; Nosov, M. I.

TITLE: Synergetic lubricating action of polysiloxanes and hydrocarbons

SOURCE: Neftekhimiya, v. 4, no. 1, 1964, 170-175

TOPIC TAGS: lubrication, synergism, polysiloxanes, hydrocarbons, antiwear lubricant, antifriction lubricant, antiwear test, antifriction test, petroleum product lubricant, silicon lubricants

ABSTRACT: The previously reported synergism in lubricant mixtures of polysiloxanes with some petroleum lubricants enriched with aromatic hydrocarbons has been further investigated by determining antiwear and antifriction properties of the following individual hydrocarbons and mixtures of them with polyethylsiloxanol liquid: diphenylmethane (isomeric mixture) (I), di-o-xylylmethane (II), 4,4'-diisopropyldiphenylmethane (III), 1,1-di-o-xylylethane (IV), 4-mono-isopropyldiphenyl (V), cumene (VI), and 2,6-di-tert.-butylmethyl benzene (VII). The tests were carried out on the four-ball MT-4 friction apparatus at

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ACCESSION NO: AP4024413

50C and a sliding speed of 23 cm/sec. The results (shown graphically) indicate that low-molecular-weight aromatic hydrocarbons (such as III and VI), which are readily oxidized to form hydroperoxides, possess high, antiwear and antifriction lubricating properties. Sharp synergism was observed for the mixtures of III and VI with the polyethylsiloxanol liquid over a wide range of concentration of components. The role of atomic oxygen in the improvement of the lubricating properties of hydrocarbon lubricants and the role of hydroperoxides in transporting molecular oxygen to the metal surface is discussed in detail. The effectiveness of molecular oxygen as an additive to lubricants depends on the nature of the hydrocarbons which constitute the lubricant and on the ability of the hydrocarbons to form hydroperoxides. Orig. art. has: 4 figures.

ASSOCIATION: Institut neftekhimicheskogo sinteza AN SSSR im. A. V. Topchiyeva (Institute of Petrochemical Synthesis, AN SSSR)

SUBMITTED: 27Jun63

DATE ACQ: 17Apr64

ENCL: 00

SUB CODE: CH

NO REF SOV: 011

OTHER: 001

Card 2/2

VINOGRADOV, G.V.; PAMOTIN, D.S.; M.G.W., L.S.

Influence of the nature of polyoxymethylene on its effect as  
additives to hydrocarbon lubricants. *Neftekhimiya* 4 no.7:  
345-350 Mr-ap'64 (MIRA 1783)

1. Institut neftekhimicheskogo sinteza AN SSSR Lenini Topchiyeva.

ACCESSION NR: AP4040605

S/0204/64/004/003/0510/0517

AUTHOR: Vinogradov, G. V.; Nametkin, N. S.; Nosov, M. I.

TITLE: Effect of oxygen and oxidation initiators (hydroperoxides) on the antiwear and antifriction properties of polysiloxanes

SOURCE: Neftekhimiya, v. 4, no. 3, 1964, 510-517

TOPIC TAGS: lubricant, polysiloxane, polysiloxane lubricant, antiwear property, antifriction property, oxidation, polyethylsiloxane, polymethylphenylsiloxane, methane. 4.4'diisopropyl-, hydroperoxide, oxidation initiator, isopropylbenzene hydroperoxide, seizing, friction coefficient

ABSTRACT: The effect of the oxidative activity of the ambient gas phase and the agents which intensify the oxidation on the antiwear and antifriction properties of polysiloxane fluids under heavy loads was studied at the Institute of Petrochemical Synthesis imeni A. V. Topchiyev, AS USSR. A polymethylsiloxane, a polyethylsiloxane, and two polymethylphenylsiloxanes with a medium and a high content of phenyl groups in the molecule, designated Polymer 1 and Polymer 2

Card 1/3

ACCESSION NR: AP4040605

respectively, were used; in some experiments 4,4'-diisopropyldiphenylmethane was added to the polysiloxane fluids to determine the effect of the presence of an easily oxidizable hydrocarbon. The experiments were conducted on a four-ball machine. Variations in the oxidative activity of the ambient gas phase were achieved by conducting the experiments in vacuum, in the air, and by blowing oxygen at the rate of 12 l/hr through the lubricant in the four-ball chamber. In some experiments, varying amounts (0.5—3%) of isopropylbenzene hydroperoxide were added to the lubricating fluids as the oxidation initiator. The dependence of the wear on the load, friction-vs.-time diagrams, and dependence of the friction coefficients on the load were obtained for temperatures of 50, 120, and 200C. It was found that the oxidizing agents and easily oxidizable hydrocarbons exert the same effect in polysiloxane fluids as in hydrocarbon lubricants, namely, a decrease in seizing, which becomes degenerated and is terminated. This effect on the lubricating properties of polysiloxanes increases with the decrease of the thermoxidative stability of the latter, e.g., in the sequence:

polyethylsiloxane → Polymer 1 → Polymer 2.

Cord 2/3

ACCESSION NR: AP4040605

The effect is weaker than that observed in hydrocarbon lubricants. The antifriction properties of the polysiloxanes are more susceptible than their antiwear properties to the effect of the ambient gas phase and the composition of the lubricating medium. Orig. art. has: 5 figures.

ASSOCIATION: Institut neftekhimicheskogo sinteza AN SSSR im. A. V. Topchiyeva (Institute of Petrochemical Synthesis, AN SSSR)

SUBMITTED: 25Jun63

DATE ACQ: 06Jul64

ENCL: 00

SUB CODE: FP,6C

NO REF SOV: 010

OTHER: 007

Card 3/3

ACCESSION NR: AP4043281

S/0065/64/000/008/0050/0053

AUTHOR: Nosov, M. I.; Vinogradov, G. V.

TITLE: The effect of additives on the antiwear and antifriction properties of polysiloxanes

SOURCE: Khimiya i tekhnologiya topliv i masel, no. 8, '1964, 50-53

TOPIC TAGS: organosulfur additive, organochlorine additive, organophosphorus additive, polysiloxane, polyethylsiloxane, polymethylphenylsiloxane, triphenyl phosphate, antiwear property, steel seizing, lubricant

ABSTRACT: The effect of certain organosulfur, organochlorine, and organophosphorus compounds as additives in various polysiloxanes was studied for the purpose of determining the specific action of additives on the boundary friction, establishing the relationship between the activity of additives and the nature of polysiloxanes, and determining the effect of molecular oxygen on the activity of the additives. The polysiloxanes used were polyethylsiloxane (PES) liquid, polymethylphenylsiloxane liquid with a low-phenyl group

Cord 1/4

ACCESSION NR: AP4043281

content (polymer 3), and polymethylphenylsiloxane with a high phenyl-group content (polymer 2). Triphenyl phosphate (1), dibenzyl disulfide (2), sulfolene (3), isohexylthiophene (4),  $\alpha$ -butylthiophene (5), 2-acetylmercaptothiophene (6), 2-mercapto-5-ethyl-3-thiophene-carboxylic acid (7), 2-mercapto-5-ethyl-3-thenylenimine (8), 2-benzimidazolethiol (9), N-methyl-2-benzimidazolethiol (10), and chlorinated paraffins ( $C_{25}H_{51}Cl$  to  $C_{25}H_{40}Cl_{12}$ ) (11) were used as additives. The additive concentration was taken as 1% sulfur in the lubricant for sulfur-containing additives and 0.2% phosphorus for triphenyl phosphate. The additives did not dissolve completely in the polysiloxanes, but formed suspensions. It was proved that the highest activity of the additives can also be displayed in the emulsified or suspended state. The experiments were carried out on a four-ball apparatus at 50C and at a sliding velocity of 23 cm/sec by a step-loading method with no change in the friction surface. To determine the effect of the nature of the polysiloxane on the effectiveness of the additives, polymer 3 was tested with additives, 2, 3, 7-9, and polymer 2 with additives 1-3, 9, 11. The antiwear property of polymer 3 was not improved by any of the additives. Only chlorinated paraffin improved the antiwear property of polymer 2 for

Card 2 / 4

ACCESSION NR: AP4043281

small loads. Additives which are highly effective in hydrocarbon lubricants in respect to preventing seizing of steel are less effective in polysiloxanes. Their activity sharply drops in the transition from polyethylsiloxane to polymethylsiloxane and drops even further in the transition to polymethylphenylsiloxane which possesses thermooxidation stability. It was proposed that in the decomposition of widely known additives which determines their effectiveness against the seizing of steel, a chain reaction is initiated in which the basic components of the lubricating oils take part. The effectiveness of the additives against seizing decreases in lubricating media with increasing stability in respect to reactions with free radicals. The ineffectiveness of additives in the polymethylphenylsiloxanes can be explained by this phenomenon. It is noted that the activity of certain polysiloxanes as lubricating media must be taken into account in studying the additive action against the seizing of steel in polysiloxanes. On the basis of comparison of the experimental results for solutions of additives in polyethylsiloxane in air and in vacuum, it was concluded that molecular oxygen influences the effectiveness of the additives in different ways. Orig. art. has: 2 figures and 1 table.

Card

3/4

ACCESSION NR: AP4043281

ASSOCIATION: INKhs AN SSSR

SUBMITTED: 00

ATD PRESS: 3084

ENCL: 00

SUB CODE: FP

NO REF SOV: 008

OTHER: 007

Card 4/4

MUSTAFAYEV, E. [deceased]; MALKIN, A.Ya.; PLOTNIKOVA, Ye.P.; VINOGRADOV, G.V.

Rheological properties of polyisobutylene. Vysokom.soed. 6 no.8:1515-  
1521 Ag '64. (MIRA 17:10)

1. Institut neftekhimicheskogo sinteza AN SSSR, laboratoriya reologii  
polimerov.

VINOGRADOV, G.V.; ZABUGINA, M.P.; KONSTANTINOV, A.A.; KONYUKH, I.V.; MALKIN,  
A.Ya.; PROZOROVSKAYA, N.V.

Viscosity measurements of polymers in the condensed state by rotatory  
and capillary instruments. Vysokom.soed. 6 no.9:1646-1650 S '64.  
(MIRA 17:10)

1. Institut neftekhimicheskogo sinteza AN SSSR.

NOSOV, M.I.; VINOGRADOV, G.V.

Effect of additives on the antiwear and antifrictional  
properties of polysiloxanes. Khim. i tekhn. topl i masel  
9 no.8:50-53 Ag '64. (MIRA 17:10)

1. Institut neftekhimicheskogo sinteza AN SSSR.

FAYNSHTEYN, R.M.; KORYTOVA, Ye.A.; KONYUKH, I.V.; VINOGRADOV, G.V.

Rheology of polymers. Effect of the fractional composition of  
high-pressure polyethylene on the viscosity characteristics  
of the melt. Plast. massy no.11:31-34 '64 (MIRA 18:1)

S/0069/64/026/003/0296/0300

ACCESSION NR: AP4037175

AUTHOR: Deynega, Yu. F.; Vovnenko, A. M.; Vinogradov, G. V.

TITLE: Electric conductivity of plastic dispersion systems under static and dynamic conditions

SOURCE: Kolloidnyy zhurnal, v. 26, no. 3, 1964, 296-300

TOPIC TAGS: lubricant electroconductivity, soap oil grease, plastoviscometer condenser, lubricant specific resistance, dielectric lubricant, electrokinetic phase change, electrolysis, lubricant elastic deformation

ABSTRACT: This electroconductivity was studied in soap-oil greases, with a rotatory plastoviscometer in which the interior and exterior cylinders were isolated and which could be rapidly stopped serving as a condenser. The equipment is described in detail. Direct current resistance was measured with a megaohmmeter. Standard error was  $\pm 1.5 - \pm 10\%$ . Structural changes of the greases in the electric fields were determined by the polarization-optical method. The greases studied were sodium, calcium and lithium-based soaps thickened with mineral oil; 20.6% Na soap of castor oil acids, 17.5% hydrated Ca soap of cottonseed oil acids and 10%

Card

1/3

ACCESSION NR: AP4037175

technical Li stearate. A double electric layer is known to exist in soap-oil greases on the boundary surface. Its presence is reflected in the dielectric characteristics of the lubricants. The typical soap-oil greases had a specific resistance of  $10^{10} - 10^{14}$  ohm/cm (Li highest, Ca lowest). Upon applying a constant electric field, the specific resistance of these systems will increase with time. Change of the charge sign of the electrodes will cause a sharp drop of specific resistance. These effects were connected with various manifestations at the electrodes (e.g. electrolysis, and gas bubbles). As a result of electrolysis, water gradually disappears from the system, affording electrokinetic phase change. At the surface of the negative electrode a layer of the dispersion medium is formed. Simultaneously the structural framework is compressed at the positive electrode and the thickness of the boundary layer increases with the duration of electric field action. A drop of specific resistance occurs as a result of grease deformation. Upon abrupt stopping of the plastoviscometer-condenser, a sharp change of specific resistance is also registered. Under the influence of the force of inertia, elastic deformation of the structural framework takes place. This may pull the material off the rotor surface. Upon return of this framework, the material will again make contact with the rotor. This explains the rapidly alternating increase and decrease of specific resistance upon sharply decelerating the system.

Card 2/3

ACCESSION NR: AP4037175

Moisture plays an important part. Orig. art. has: 3 figures.

ASSOCIATION: Institut obshchey i neorganicheskoy khimii AN UkrSSR, Kiev (Institute of General and Inorganic Chemistry AN UkrSSR)

SUBMITTED: 01Oct62

ENCL: 00

SUB CODE: GC, EM

NO REF SOV: 007

OTHER: 003

Card

3/3

LEONOV, A.I.; MALKIN, A.Ya.; VINOGRADOV, G.V.

Effect of the rigidity of dynamometers on the results of rheological measurements. Koll. zhur. 26 no.3:335-340 My-Je '64 (MIRA 17:9)

1. Institut neftekhimicheskogo sinteza AN SSSR imeni Topchiyeva.

VINKOVAC, C.V. (1957-71); VINKOVAC, C.V. (1971-74)

Rheological properties of polymers in the liquid state.  
PMT no. 5165-71 S-0 '64.

L 16378-65 EAT(R)/ZEP(O)/ENF(A)/T Po-1/17-4 AED(a)/ZSD/AFWL/AST(f)-2/AFETR RM  
ACCESSION NR: AP4045404 S/0068/64/026/005/0567/0573

AUTHOR: Vinogradov, G. V.; Dogadkin, B. A.; Prozorovskaya, N. V.; Neverov, A. P.

TITLE: Rheology of polymers. Study of viscous properties of divinylstyrene rubber

SOURCE: Kolloidnyy zhurnal, v. 26, no. 5, 1964, 567-573

TOPIC TAGS: rubber viscosity, viscosimeter, deformation, shear stress

ABSTRACT: The viscous properties of elastomers were determined by measuring the mean rate of deformation ( $\bar{D}$ ) in the capillaries as a function of shear stress on their walls ( $\tau_R$ ). For measurement of the rate of deformation and shear stress a constant pressure capillary viscosimeter was used. The main part of this instrument was a viscosimeter body into which the polymer was placed (fig. 1). In this work two types of viscometers were used (a and b). A tube is connected to the upper part of the body (1), through which gas under pressure enters the cylinder. The polymer is separated from the gas or liquid by a ball or a piston with a teflon gasket (position 3 in fig. 1). A replaceable stainless

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L 16378-65  
ACCESSION NR: AP4045404

steel calibrated capillary (5), mounted in the case (4) is placed into the bottom part of the cylinder. The case (4) is tightened with a nut (6). The capillary cases have openings (7) for insertion of the hot junction of a thermocouple. Rings (8) are used to fill the space between the wall of the cylinder and the capillary case. Using such a simple viscometer and invariant characteristic of various properties of synthetic rubber was obtained with respect to the dimensions of capillaries in a wide temperature range and at different rates of deformation (in excess of 4 orders of magnitude). For measurement of viscosity as a function of time of heating of rubber at elevated temperatures comprises a sensitive method for the evaluation of structuring of those grades of rubber which have a significant unsaturation. This structuring is significantly noticeable above 60°C and it becomes intensive above 130°C. It was found that the expansion of the stream is to a first approximation a function of shear stress. Orig. art. has 6 figures and 2 tables.

ASSOCIATION: Institut neftekhimicheskogo sinteza im. A. V. Topchiyeva (Institute of Petrochemical Synthesis)

SUBMITTED: 28Dec63

ENCL: 01

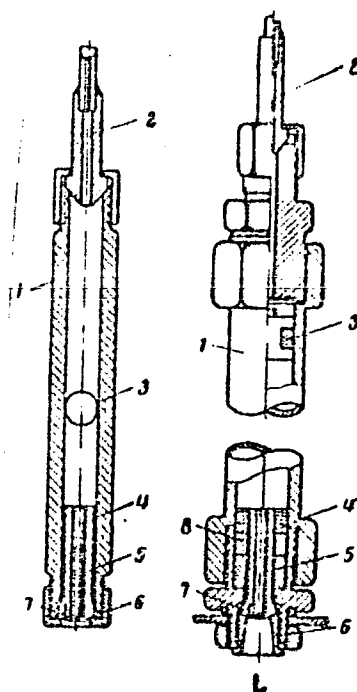
NO REF SOV: 003 OTHER: 004

SUB CODE: GC  
Card 2/3

L 16378-65  
ACCESSION NR: AP4045404

ENCLOSURE: 01

fig. 1  
Viscosimeter reservoirs



Card 3/3

s/0032/64/030/003/0364/0367

ACCESSION NR: APL020053

AUTHORS: Vinogradov, G. V.; Belkin, I. M.; Konstantinov, A. A.; Krashenninnikov, S. K.; Rogov, B. A.; Malkin, A. Ya.; Konyukh, I. V.

TITLE: Rotational elastoviscosimeters for studying polymers

SOURCE: Zavodskaya laboratoriya, v. 30, no. 3, 1964, 364-367

TOPIC TAGS: viscosimeter, elastoviscosimeter, disk cone viscosimeter, polymer strain, polymer shear stress, viscosity measurement, viscosimeter PVR 1, viscosimeter KRPD, microviscosimeter KV 2

ABSTRACT: An elastoviscosimeter of the disk-cone type shown in Fig. 1 on the Enclosures is described. For this configuration the strain rate and shear stress are determined by the equations

$$\dot{\gamma} = \frac{u}{r} \sec^{-1},$$

and

$$\tau = \frac{2}{3\pi} \frac{1 - \epsilon^2/2}{R^2} M, \text{ dynes/cm}^2,$$

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ACCESSION NR: AP4020053

(where M is the applied torque). The schematic of the complete test facility is shown in Fig. 2 on the Enclosures. This apparatus permits measurements on materials with a viscosity of  $10^{-10}$  poises at temperatures of -30 to 300C in air, in vacuum ( $\sim 10^{-3}$  mm Hg), or in an inert atmosphere. Through a system of gear boxes the speed can be continuously varied over a range of  $10^8$ . The RPM is measured by a generator, and it and various temperatures (measured by thermocouples) can be continuously recorded. The applied torque on the stationary disk 3 is measured by strain gauges mounted at  $45^\circ$  on the cylindrical shaft 4. The results obtained with this apparatus (REV-1) were compared with measurements made in a coaxial-cylindrical viscosimeter (type PVR-1), a capillary viscosimeter (type KRPD) and in a microviscosimeter (type MV-2). The results agreed within 6% in all instances. Orig. art. has: 3 figures and 2 formulas.

ASSOCIATION: Institut neftekhimicheskovo sinteza AN SSSR (Institute of Petrochemical Synthesis AN SSSR)

SUBMITTED: 00

DATE ACQ: 27Mar64

ENCL: 02

SUB CODE: GC, IE

NO REF SOV: 008

OTHER: 007

Cord 2/4

ACCESSION NR: AP4020053

ENCLOSURE: 01

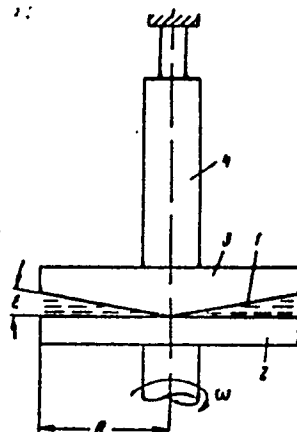


Fig. 1. Schematic of disk-cone viscosimeter

Card 3/4

ACCESSION NR: AP4020053

ENCLOSURE: 02

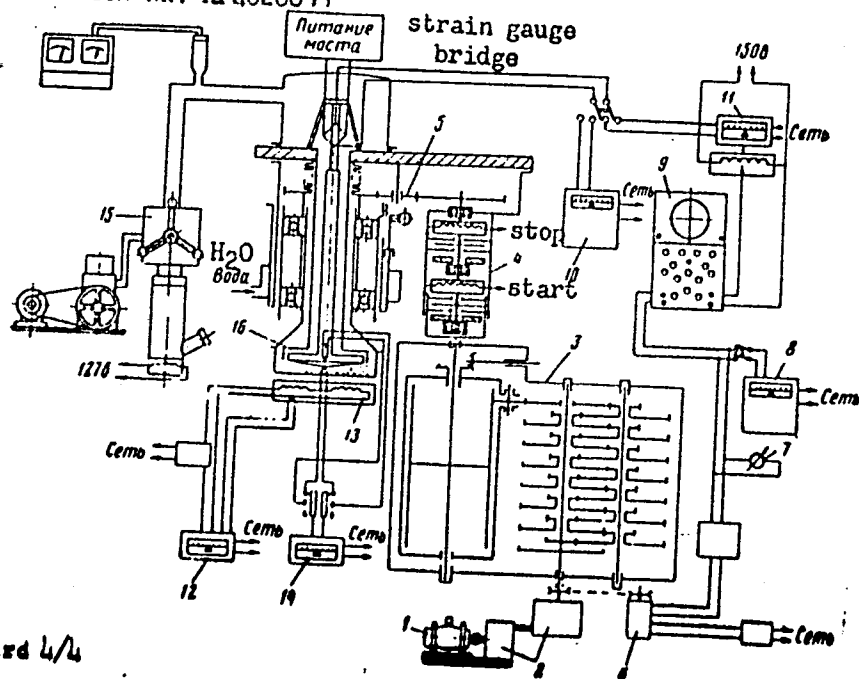


Fig. 2. Schematic of test apparatus REV-1

Card 4/4

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APPROVED FOR RELEASE: 09/01/2001

CIA-RDP86-00513R001859910017-0"

Institute of Petrochemical Synthesis,

Academy of Sciences (USSR)

Card 3/3

ACCESSION NR: AP4019982

S/0020/64/154/006/1421/1424

AUTHOR: Vinogradov, G. V.; Malkin, A. Ya.; Plotnikova, Ye. P.;  
Kargin, V. A. (Academician)

TITLE: Thixotropy of polymers in viscous flow

SOURCE: AN SSSR. Doklady\*, v. 154, no. 6, 1964, 1421-1424

TOPIC TAGS: polymer thixotropy, polyisobutylene, thixotropy, shear strength, polymer structure recovery, relaxation, structure recovery kinetics, polyisobutylene P-20

ABSTRACT: Investigations were conducted with polyisobutylene P-20 (molecular weight 20,000 - Staudinger; 100,000 - Flory) to determine the existence of thixotropy in polymers and to show that reversible changes in their structures occur on reaching the shear strength prior to steady-state flow. The present work confirmed that deformation of polyisobutylene can be accompanied by thixotropic breakdown of its supramolecular structures which occurs on reaching the shear strength. The rate of structure recovery is much lower than the rate of decrease of stresses during relaxation. Orig. art. has: 4 figures.

Card 1/2

ACCESSION NR: AP4019982

ASSOCIATION: Laboratoriya reologii polimerov Instituta neftekhimicheskogo sinteza Akademii nauk SSSR (Polymer Rheology Laboratory, Institute of Petrochemical Synthesis, Academy of Sciences SSSR)

SUBMITTED: 11Oct63

DATE ACQ: 23Mar64

ENCL: 00

SUB CODE: OC

NO REF SOV: 003

OTHER: 003

ATD PRESS: 3044

Card 2/2

ACCESSION NR: AP4022723

S/0020/64/155/002/0406/0408

AUTHOR: Leonov, A. I.; Vinogradov, G. V.

TITLE: Rheology of polymers. Theory of tixotropy

SOURCE: AN SSSR. Doklady\*, v. 155, no. 2, 1964, 406-409

TOPIC TAGS: tixotropy theory, polymer rheology, rheology, polymer relaxation spectrum, plastics, viscoelastic property

ABSTRACT: The paper presents an approach to the theory of tixotropy which differs from those given by other authors (see S. J. Hahn, T. Ree and H. Eyring, J. Chem. Phys. 51, 856 (1959)) and which considers the phenomenon as a reversible (with respect to time) change of structure and of properties of systems under the influence of external (for instance, mechanical) interactions. The viscoelastic properties of tixotropic systems is described by a model consisting of Maxwellian elements in parallel, and is characterized by a relaxation function which gives the relaxation spectra and its change with time. The developed the-

Cord 1/2

ACCESSION NR: AP4022723

ory agrees qualitatively with the experiments (G. V. Vinogradov, I. M. Belkin, and V. A. Kargin, DAN 148, #2, 309 (1963)). Orig. art. has: 1 figure and 16 equations.

ASSOCIATION: AN SSSR

SUBMITTED: 31Oct63

DATE ACQ: 08Apr64

ENCL: 00

SUB CODE: MA, CH

NO REF SOV: 003

OTHER: 005

Card 2/2

VINOGRADOV, G.V.; TITKOVA, L.V.

Polymer aerogel-systems with highly developed surfaces. *Nekl.zhur.*  
27 no.1:138-139 Ja-F '65. (MIRA 18:3)

1. Institut neftekhimicheskogo sinteza AN SSSR, Moskva.

L 40802-65 EXT(m)/EPF(c)/T Pr-4 DJ

S/0069/65/027/002/0289/0289

ACCESSION NR: AP5008405

AUTHORS: Deynega, Yu. F. (Moscow); Sinityn, V. V. (Moscow); Vinogradov, G. V. (Moscow)

31  
B

TITLE: Optical anisotropy of calcium lubricants 112

SOURCE: Kolloidnyy zhurnal, v. 27, no. 2, 1965, 289

TOPIC TAGS: anisotropy, calcium compound, lubricant, soap, polarization, crystal lattice, electron microscopy, optic diffraction / US 2 lubricant

ABSTRACT: Optical polarization method and electron microscopy were used in studying the structural changes in hydrated calcium lubricant US-2 under the influence of heating. The angle between the flow vector of the lubricant and the polarization plane was  $45^\circ$ . Upon heating the lubricant to 45-50C, its light green color was replaced by dark red, in the absence of diffraction. The green returned at cooling the substance to room temperature. However, after heating to 70C the change became irreversible. Electron microscope study showed that up to 50C the structure of the dispersion phase did not change, whereas at 70C it changed sharply. As has been stated by R. Grin-Kelli and B. V. Deryagin (Dokl. AN SSSR, 153, 638, 1963), the reversible change in the optical properties

Card 1/2

L 40302-65

ACCESSION NR: AP5008905

on heating to 50C is caused by the reversible changes in the anisotropic structure of water films in the crystalline hydrates of the substance. Vast changes in the crystal lattice at 70C cause the irreversible changes of the structure and the optical properties of the liquidant. Reference is made to Figure 1 shown in the original article.

ASSOCIATION: none

SUBMITTED: 14Oct64

ENCL: 00

SUB CODE:FP,CP

NO REF SOV: 003

OTHER: 001

Card

*ps*  
2/2



L 41642-65

ACCESSION NR: AP5006662

ating properties of solutions of polysiloxanes in hydrocarbon mixtures deteri-  
orated, but when the sliding rate was reduced these properties improved. Dr. Z.  
art. has: 2 figures.

ASSOCIATION: MNKhS AN SSSR

SUBMITTED: 00

ENCL: 00

SUB CODE: TP, OC

NO REF SOV: 005

OTHER: 000

CC  
Card 2/2

ACCESSION NR: AP5002103

AUTHORS: Vinogradov, G. I.; Yanovskiy, Ya. I.

TITLE: Frequency rheometer for investigating the dynamic properties of polymers at  
sonic frequencies

SOURCE: Zavodskaya laboratoriya, v. 31, no. 1, 1965, 115-118

TOPIC TAGS: polymer property, rheometer, polyethylene/ 2 20 polyisobutylene, 7Z 44  
audio generator, 1000 1/2 inch graph, 1115 3 1/2 inch, 1115 1/2 frequency analyzer

ABSTRACT: The experience gained in the use of one of the simplest methods of measuring the viscoelastic properties of polymers and a rheometer which represents a modification of the parallel-plate type (E. R. Fitzgerald and J. Ferry, *J. Colloid Interface Sci.*, 1967) is reported.

Card 1/4

L 25296-65

ACCESSION NR: AP5002183

magnet (4) and the core(5) of  $10^4$  gauss. The tube is suspended by 8 supports (6). The samples are cylinders 6-20 mm in diameter and 1-7 mm thick. The measuring circuit for the rheometer is shown in Fig. 2 on the enclosure. Current (up to 15 mA) from the audio generator (1) (type GZ-4A) drives the coil 1A through the amplifier II. Coil 2A is placed in one arm of the bridge and acts as impedance  $Z_{el}$ . In the bridge circuit, an oscillograph IV (ENL-1) is used as the indicator receiving the signal from the amplifier V (UFP-2). Spectral analysis is performed by frequency analyzer VI (AS-100H-1) with power supply VII. The mechanical impedance  $Z_m$  is related to the electrical impedance  $Z_{el} = \frac{R_1 + j\omega L_1}{R_2 + j\omega L_2}$  by  $Z_{el} = K/Z_m$ , where  $K$

is a constant obtained during calibration (i.e., by measuring the mechanical impedance of the tube with a sample). The quantity  $\eta_n = \frac{1}{\omega_n} \frac{d\tau}{d\gamma_n}$  (where  $\tau$  = dynamic viscosity,  $\gamma_n$  = maximum viscosity as per Newton) can be considered as a function of  $\omega_n = \omega \eta_n$ . Since according to P. Bueche (Physical Property of Polymers, 221, Interscience Publ., 1962) one can obtain a general temperature invariant dynamic-static viscosity characteristic for polymers, the measured  $\eta_n$  is

Card 2/4

ACCESSION NR: AP5002165

should coincide with the measured  $\eta_{sp}/c_n$  ( $\eta_{sp}$  = effective static viscosity) as a function of  $\gamma_n = \gamma_{sp}/c_n$ . Measurements at 20, 40 and 600 and  $3 \cdot 10^2 - 10^3$  cps were performed with polyisobutylene P-20 (and at 150 and 500 and  $2 \cdot 10^2 - 2 \cdot 10^3$  cps with high pressure polyethylene. The accuracy of the measurements was found to be excellent. Orig. art. has: 3 figures.

ASSOCIATION: Institut neftekhimicheskogo sinteza, Akademii nauk, SSSR (Institute of Petroleum Chemical Synthesis of the Academy of Sciences, SSSR)

SUBMITTED: 00

ENCL: 01

SUB CODE: MT

NO REF SOV: 005

OTHER: 004

Card 3/4

L 25296-65

ACCESSION NR: AP5002183

ENCLOSURE: 01

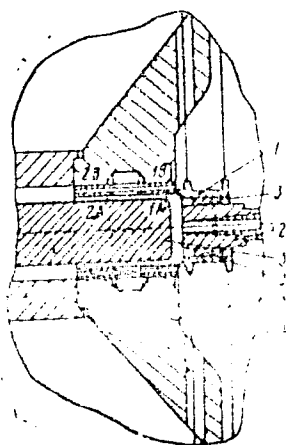


Fig. 1 Frequency rheometer

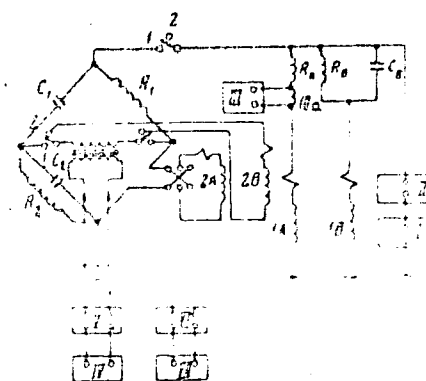


Fig. 2. Measuring circuit

Card 4/4

I. 24148-65 EFF(c)/ENP(j)/EXT(m)/T Pc-4/Pr-4 RM

ACCESSION NR: AP5602185

S/0032/65/031/001/0123/0124

AUTHORS: Konyukh, I. V.; Zabugina, M. P.; Vinogradov, G. V.

TITLE: Dilatometer for polymers

SOURCE: Zavodskaya laboratoriya, v. 31, no. 1, 1965, 123-124

TOPIC TAGS: dilatometer, polymer property, polyethylene, polypropylene, polystyrene

ABSTRACT: A simpler dilatometer representing a modification of a capillary microviscosimeter was developed. It permits measurements at temperatures between below 0C and 300C, using  $\leq 1$  g of polymer and requiring 4 to 6 hours for determining the density-temperature relationship. The working assembly consisting of a cylinder (1) (see Fig. 1 on the Enclosures), piston (2), and clamping nut (3) is made of invar. The sample (4) is placed between the piston and nut, and the change in volume is measured with an indicator (5). The heater is powered by a transformer (7), and is regulated by a thermostat (8) connected to a thermocouple (9). A potentiometer and thermocouple are used for temperature measurements. The density as a function of temperature was measured for several polymers and is shown in Fig. 2 on the Enclosures. It was found that the data were

Card 1/4

L 24148-65

ACCESSION NR: AP5002185

reproducible with an accuracy of 98%. Orig. art. has: 2 figures.

ASSOCIATION: Institut neftekhimicheskogo sinteza Akademii nauk, SSSR (Institute  
of Petrochemical Synthesis, Academy of Sciences, SSSR)

SUBMITTED: 00

ENCL: 02

SUB CODE: MT

NO REF SGT: 001

OTHER: 000

Card 2/4

ABSTRACT

AUTHORS: Vinogradov, G. V.; Titkova, L. V.

TITLE: Polymer aerogels—Systems with highly developed surfaces

SOURCE: Kolloidnyy zhurnal, v. 27, no. 1, 1965, 138-139

TOPIC TAGS: polymer, porous surface, sublimation, amorphous polymer, benzene

ABSTRACT: A method is described for obtaining highly developed polymer aerogel surfaces. The method consists of desiccating the solvent by subliming water from its frozen state. For amorphous as well as for highly crystalline polymers, benzene is considered to be the best solvent because of its high vapor tension and high melting point. The temperature regime of the sublimation process has been found to play a significant role in microporous surface formation. Unit surfaces as high as  $170 \text{ m}^2/\text{g}$  have been obtained from polyphenylsiloxane solutions. A shrinkage curve for various polyphenylsiloxane solution concentrations is presented. Orig. art. has: 1 figure.

ASSOCIATION: Institut neftekhimicheskogo sinteza AN SSSR, Moscow (Institute of Petrochemical Synthesis, AN SSSR)

Card 1/2

L 30007-65

ACCESSION NR: AP5004744

SUBMITTED: 12 Jun 64

ENCL: 00

SUB CODE: 00, 00

NO REF SOV: 000

OTHER: 000

Card 2/2

VINOGRADOV, G.V., doktor khim. nauk, prof., otv. red.; DINTSES,  
A.I., doktor khim. nauk, otv. red.; GARKUNOV, D.N.,  
doktor tekhn. nauk, otv. red.; GORSHKOV, G.B., red.

[Theory of lubricating action and new materials] Teoriia  
smazochnogo deistviia i novye materialy. Moskva, Nauka,  
1965. 245 p. (MIRA 18:7)

1. Akademiya nauk SSSR. Nauchnyy sovet po trebiyu i  
smazkam.



L 45226-65

ACCESSION NR: AT5010240

textolite coupled with armco iron, the character of friction is determined by the transfer of iron onto the surface of the plastic, and hence, by the marked dependence of the friction process on the oxidizing activity of the gaseous medium. The effectiveness of the action of liquid lubricants is determined not only by the composition and properties of the lubricant, but also by the nature of the plastic. This action may increase or decrease with the change in the nature of the plastic. The decrease in the coefficient of friction of glycerol, observed on some plastics, is undoubtedly due to the increase in the chemical activity of plastic when several contact points are employed. Orig. Eng. Inst. 2 figures and 1 table.

ASSOCIATION: none

SUBMITTED: 00

ENCL: 00

SIR CODE: MT, Mo

NO REF SOV: 026

OTHER: 009

*ML*  
Card 2/2

L 45227-65    EWT(m)/EWP(w)/EPT(o)/EWA(d)/EPR/EWP(j)/T/EWP(t)/EWP(b)/EWA(c)

PC-4/Pr-4/PS-4 RPL JD/WW/PM

ACCESSION NR: AT5010241

UR/2711/64/000/019/0127/0137

AUTHOR: Vinogradov, G. V.; Podol'skiy, Yu. Ya.; Mustafayev, V. A.

TITLE: Wear resistance of steel in the presence of polymer powders

10-117

TOPIC TAGS: steel friction, steel wear resistance, powdered polymer, polymer friction, polymer lubricant, metal surface, polymer rheological property

**ABSTRACT:** The behavior of powders of the following polymers was studied in friction tests on steel balls: polymethyl methacrylate, polypropylene, polyethylene (with various contents of CH<sub>3</sub> groups), polyvinyl butyral, polystyrene, polyformaldehyde, polytetrafluoroethylene, polyvinyl chloride, polyvinylidene chloride, polyvinyl dimethylphenylsilane, polyvinyl methylphenylsilane, and polyvinyl trimethylsilane. Under severe friction conditions (high loads and sliding velocities), the antifriction and antiwear properties of the powdered polymers are determined by a combination of the rheological properties of the polymers and their capacity to modify steel surfaces chemically. Remarkable antiwear properties over the

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L 45227-65

ACCESSION NR: AT5010241

entire range of loads studied were displayed by powders of polypropylene and polyethylene with a maximum degree of branching, and also by polytetrafluoroethylene. The optimum antiwear properties are exhibited by polymers which are sufficiently stable at high temperatures, but are also able to perform the functions of oxygen suppliers and other agents that solid lubricants perform at high temperatures. Orig. art. has: 7 figures.

ASSOCIATION: none

SUB CODE: NT, MM

SUBMITTED: 00 -----

NO REF SOV: 007

Card 2/2

L 51495-65 EPF(c)/EWP(j)/EWT(m)/T Pc-4/Pr-4 RM  
ACCESSION NR: AP5016495 UR/0191/64/000/011/0031/0034

AUTHOR: Faynshteyn, R. M.; Korytova, Ye. A.; Konyukh, I. V.; Vinogradov, G. V.

TITLE: Rheology of polymers. Influence of the fractional composition of high-pressure polyethylene on the viscosity properties of the melt

SOURCE: Plasticheskiye massy, no. 11, 1964, 31-34

TOPIC TAGS: polymer, polyethylene plastic, solid mechanical property

ABSTRACT: A comparison of the flow curves of three samples of high-pressure polyethylene indicated that the viscosity properties are practically not influenced by the nature of the initiator, and the apparatus of the process also exerts comparatively little influence. The deciding factor for the viscosity properties of the polyethylene melts was found to be the molecular weight; with increasing molecular weight, the effective viscosity, compared at constant shearing stress or rate of shear, increases, and the viscosity anomaly is more sharply manifested. Polydispersion affects chiefly the effective viscosity, which increases as the molecular weight distribution is

Card 1/2